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## SECTION 23

# SIMERC: SANITARY, GRAVITY

23-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, not furnished by the Government, and in performing all operations in connection with the construction of the sanitary sewers, including appurtment structures and house severs to points of connection with the building drains 5 feet outside the building to which the sever system is to be connected, complete, in strict eccordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

23-02 APPLICABLE SPECIFICATIONS: The following specifications, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification:

# Foder 1 Specifications:

HH-P-117 Packing; Jute, Twisted
QQ-I-652 Iron, Grey; Castings
SS-C-192a Cements, Portland
SS-P-371 Pipe; Concrete, Non-Pressure, Non-Reinforced and Reinforced

b

STATINTL

23-03 GENERAL: Gravity severs shall be constructed in conformity with this section of the specifications. Excavation, transhing and backfilling shall conform to the requirements of section on EARTHWORK: GENERAL, of these specifications. Work covered by this section will not be accepted until backfilling connected with the work has been completed satisfactorily. Any section of the sewer that is found defective in material, alimement, grade, or joints before acceptance shall be corrected to the satisfaction of the Contracting Officer.

#### 23-04 MATERIALS:

STATINTL

- of type I, class I.
- b. Concrete aggregates shall be as specified in section on CONCRETE, of these specifications.
- c. Joint packing shall conform to Federal Specification HH-P-117 except that the material may be jute or hemp fiber. The material shall be dry when used with bituminous joint compound and shall be either

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dry or tarred with a suitable grade of pine tar when used with cement mortar joints. The packing shall be square braided or tightly twisted as may be suitable for the type of joint.

- d. Fipe shall be concrete pipe. Concrete pipe and fittings shall conform to Federal Specification SS-P-271, bell-and-spigot type. Pipe less than 24 inches in diameter shall be type I, unless otherwise indicated on the drawings or specified.
- e. <u>Portland Coments</u> Portland coment shall conform to the requirements of Federal Specification SS-C-192a, type I.

23-05 COATING: All concrete sanitary sever pipe including fittings shall be lined.

- a. <u>Materials</u>: The corrosion-resistant coating shall consist of coal-tar base materials without any trace of asphalt or petroleum derivatives. The coating shall consist of processed coal-tar pitch, refined coal-tar oils and compatible resins and pigments, and shall be free of all water, benzel and other toxic solvents. The coating shall be air-drying, shall adhere perfectly to concrete and shall be unaffected by the lime or alkalies therein. Coating shall dry hard, in a dense, smooth film free of bubbles or other defects, and shall not soften or sag from the heat of the sun. Coating shall have a consistency that will permit its application at 250 square feet per gallon without running or sagging while net. It shall be bitumestic \$107 as manufactured by the hailes Dove-Hermiston Corporation, or approved equal. Material shall be used and hendled in strict accordance with the manufacturer's recommendations.
- b. Application: Fittings may be coated by dipping, brushing or swabbing, at the Contractor's option. In the event that the coating becomes too thick to dry or drain well, 5 to 15 percent of a thinner approved by the manufacturer of the coating material may be added to reduce the coating material to the proper consistency. The coating shall be so applied as to cover the entire inner surface of the fittings in a continuous coat, free of bore spots and misses. The interior surfaces of all fittings shall be dry and broom-clean before the coating material is applied. Treshly-coated fittings shall be stored in such a manner as to prevent the coating from coming into contact with dirt or foreign materials which may adhere to or damage the coating.

#### 23-06 INSTALLATION:

e. <u>Location</u> where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-sumply main or service line, except that where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet.

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- b. Crossing above water lines: Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of 10 feet each side of the crossing either shall be cast-iron, steel, or other acceptable pressure pipe and without any joint closer than 3 feet to the crossing, or shall be fully encased in concrete. The thickness of the concrete including that at the pipe joints shall be not less than 4 inches.
- Pipe Laying: The bottom of the trench shall be shaped to give substantially uniform circumferential support to the lower fourth of each pipe. Pipe laying shall proceed up grade with the spigot ends pointing in the direction of flow. Each pipe shall be laid true to line and grade in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line. As the work progresses, the interior of the sever shall be cleared of all dirt and superfluous materials of every description. Where cleaning after laying is difficult because of small pipe size, a suitable swab or drag shall be kept in the pipe and pulled forward past each joint immediately after the jointing has been completed. If the maximum width of the trench at the top of the pipe, specified in the ELATIMORK: GENERAL, section of these specifications, is exceeded for any other reason than by order of the Contracting Officer, the Contractor shall install at its own expense such concrete cradling, pipe encasement, or other bedding as may be required by the Contracting Officer to support the added load of the backfill. Trenches shall be kept free from water until the pipe jointing material has set and pipe shall not be laid when the condition of the trench or the weether is unsuitable for such work. At times when work is not in progress, open ends of pipe and fittings shall be securely closed to the satisfaction of the Contracting Officer so that no trench water, carth, or other substance will enter the pipe or fittings.
- d. Jointing: Joints in bell-and-spigot concrete pine shall be made with class I bituminous joint scaler. The scaler shall be heated to the proper temperature to permit rapid pouring and to obtain strong adhesion of the compound to the pipe. The temperature of the molten compound shall be between 350 degrees F and 450 degrees F unless otherwise recommended by the manufacturer. The compound shall not be over-heated or subjected to prolonged heating which might cause a change in its physical properties. Before pouring bituminous scaler, the inside of the bells and outside of the spigots shall be dry and clean before pouring and shall be primed if and as recommended by the manufacturer of the scaler. The joint shall be made as follows: The pipe shall be centered so that the annular space is uniform. The annular space shall then be well-calked with jute, ockum, or homp packing that is free from eil and grease. The depth of the packing shall be such as to leave a space, measured from the end of the bell of at least one inch for pipes 15 inches and less in diameter and l-2 inches for pipes 18 to 24 inches in diemeter. When the jointing is made with the pipe in its final location, a suitable joint runner, previously dipped into thick and or grout to permit easy removal when the joint has cooled, shall be placed around the pipe, leaving an opening at the top of the runner. The molten scaler shall be poured continuously into this opening until the joint is completely filled and shall be poured

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- cooled or set, the runner may be removed. Alternato joints may be poured before the pipe is lowered into the trench. In this case the joint shall be poured with the pipe in vertical resition without the use of the runner. The scalar shall have thoroughly set before the pipe is placed in the trench and the pipe shall be handled so as not to cause defermation of the joint.
- c. <u>Infiltration</u>: If, in the opinion of the Centrating Officer, infiltration appears excessive, the amount of leakage shall be measured by a suitable veir as directed by the Centrating Officer and at the Centrator's expense.
- 23-07 CONCRETE CRADLE AND ENCASEMENT: The pipe shall be supported on a concrete or die or one sed in concrete where indicated on the drawings or required by the Centracting Officer. The concrete shall consist of one part portland coment, 2-1 parts fine aggregate, and 5 parts gravel, with just enough water to produce a work ble consistency.
- 23-08 WYE BRINCHLS: Commercially meanufactured wye branches shall be installed where sower connections are indicated on the drawings or where required by the Contracting Officer. Cutting into pipe for connections shall not be done except in special cases approved by the Contracting Officer. When conditions are such that the connecting pipe cannot be adequately supported on undisturbed earth or temped backfill, it shall be encased in concrete or supported on a concrete eradle as directed by the Centracting Officer. Concrete required due to conditions resulting from feulty construction methods or negligence of the Centractor shall be installed at the Centractor's expense. The installation of wye branches into an existing sever of bell-and-spigot pile shall be made by removing one pipe section, breaking off the upper helves of the bells of the next lewer section and of the section to be installed, inserting the new section and rotating it so that the unbroken half of its bell will be at the bottem. The 2 joints shall then be made with joint packing and bituminaus joint scalar specified above.

# 23-09 MANHOLLS:

e. General: Manholes shall be constructed of reinfereed concrete with east-iron frames and covers, and in accordance with the drawings. The invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sower section. Changes in direction of flew shall be node with a smooth curve of as large radius as the size of the manhole will permit. Changes in size and grade of the channels shall be node gradually and evenly. The invert channels may be somed directly in the cenerate of the manhole base, or may be constructed by laying full section sower pipe through the nanhole and breaking out the top half after the surrounding concrete has hardened. The floor of the manhole cutside the channels shall be smooth and shall slope toward the channels not less than one inch per foot nor more than 2 inches per foot. Free drop inside the manhole shall not exceed one feet measured from the invert of the inlet pipe to the top of the floor of the manhole cutside

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the channels, and drep manhales shall be constructed whenever the free drep would otherwise be greater than one feet. Manhales shall be provided with wrought-iron steps not less than 12 inches in width built into and theroughly anchored in the wells and spaced approximately 15 inches apart as shown on drawings. Bars or reds, when used for steps, shall not be less than 3/4 inch in diameter.

- b. <u>Concrete:</u> Except as otherwise indicated on the drawings, concrete and reinferced concrete shall conform to the requirements specified for Class AA concrete under section on CONCRETE, including the requirements for materials, proportions, mixing, placing, protection, curing, and the furnishing and construction of forms. The concrete ecvering over steel reinfercing shall be not less than one inch for covers and not less than  $1-\frac{1}{2}$  inches for walls and flooring, Expansion-joint filler shall be formed of bitumineus fiber conforming to A.A.S.H.O. Standard Specification M 59-42.
- c. <u>Plastering:</u> Mortar for plastering shall consist of one part portland coment and two parts fine aggregate.
- d. <u>Cast-iron frames and covers</u> shall conform to the drawings in all essentials of design. Standard casting differing in non-essential details and approved by the Centracting Officer will be acceptable. The estings shall weigh not less than 400 pounds and shall conform to the requirements of Federal Specification QQ-I-652. The letter "S", at least 2 inches high, shall be stamped or shall be so set that the top of the cover will be flush with or higher than finished grade as directed by the Contracting Officer. All manheles in paved areas shall be provided with heavy type frames and covers as indicated on the drawings.
- 23-10 CONNECTIONS TO EXISTING MANHOLES: Pipe connections to existing manheles shall be made in such manner that the finished work will conform as nearly as practical to the essential applicable requirements specified for new manheles, including all necessary concrete work, cutting and shaping.
- 23-11 CLEAN-UP: Upon completion of the installation of the sanitary severs the Centractor shall remove all surplus construction materials and debris resulting from the work.